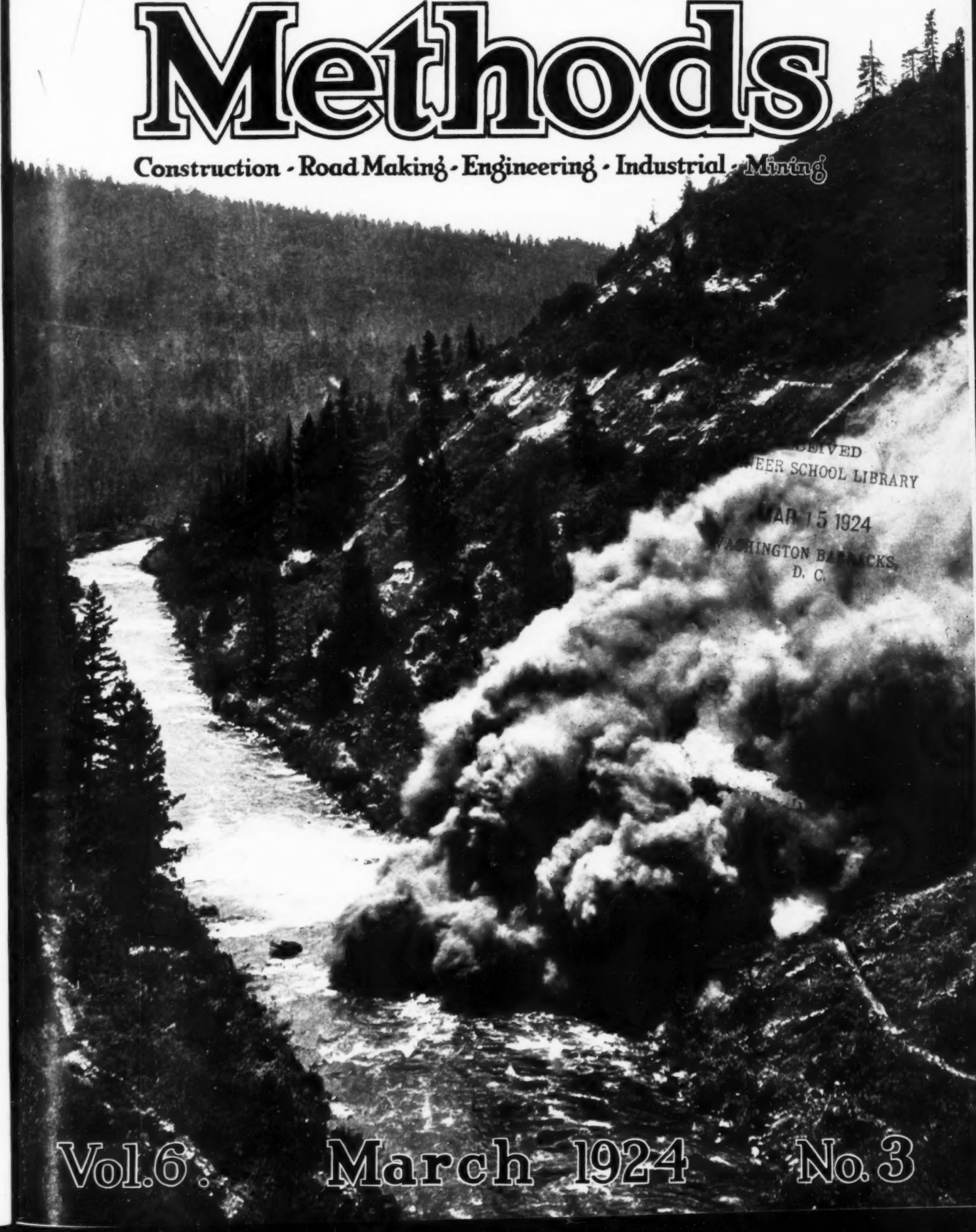
Successful Methods

Construction - Road Making - Engineering - Industrial - Mining



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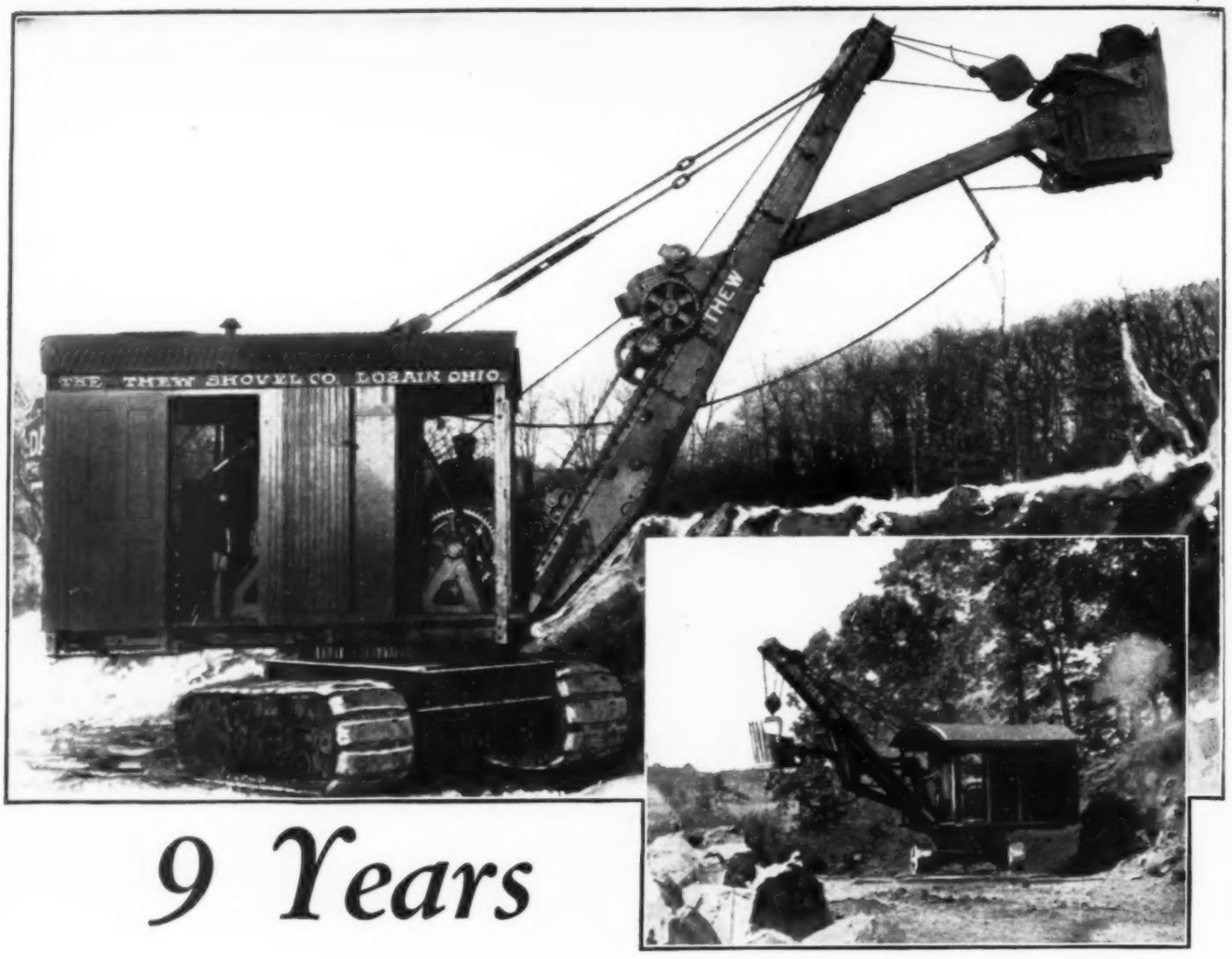


9 Years

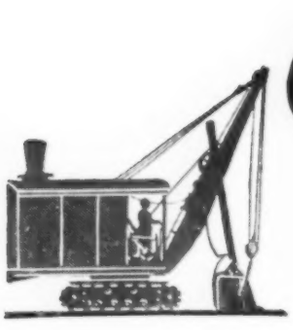
Nine years ago the first Thew gasoline shovel, shown in the small picture was put into operation. In those days it was a radical departure from accepted ideas. Today it is still going strong.

During the nine years came many developments in all shovels. These were closely followed by the Thew Gasoline. Actual field experience was the answer.

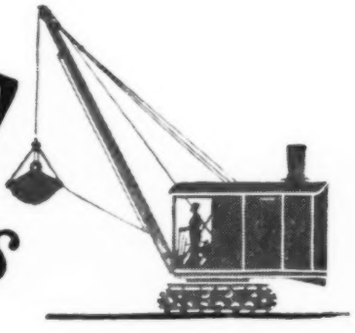
Today the Thew Gasoline shovel stands alone as the one shovel which has proved its ability. It will do anything that a three-quarter yard steam shovel will do and do it without smoke, coal and water lines; and with a one man crew.

You will want to know more about it.

THE THEW SHOVEL COMPANY, LORAIN, OHIO



Thew
Power Shovels



Successful Methods

A Magazine of Construction Service

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Vol. 6 MARCH, 1924 No. 3

A Need for Quick Action

FEDERAL aid to the States in the construction of main highways is available only until the end of June, 1925, unless new authorizations are made meanwhile by Congress. Some funds remain unexpended from the old appropriations. But if the program of Federal aid is to be continued without interruption, a law will soon have to be passed by Congress.

Surface indications are that Congress favors $100,000,000 a year for the next three years for Federal aid, as has been recommended by the American Association of State Highway Officials. The political turmoil at Washington is such, however, that even this vitally important measure may be sidetracked until it is caught in the closing jam and lost for lack of time. Hence, it is up to every voter who believes in the Federal aid highway policy to get busy quickly.

In spite of all the oil slinging at Washington, the Congressmen and Senators are listening closer than ever to the wee, small voice of the voter back home. Most of the people in Washington know that each of the 14,000,000 motor cars and trucks in this country carries at least one vote. But many Congressmen and Senators seem to question how those votes would register on the present Federal aid highway policy.

If you believe in that policy, write the Representative from your district and the two Senators from your State your ideas on the subject. Get as many of your friends as you can also to write. The main point is that there is no time to lose. Quick action is necessary.

A Backward Industry

ONE of the country's largest operators in real estate unburdened himself recently in the daily press on the backwardness of the methods used by building contractors. He pointed out that, with few outstanding exceptions, no new labor-saving methods had been adopted by builders for years. He even went so far as to say that most of the methods used today were as wasteful of labor as those of a hundred years ago.

You don't believe it? Neither did we until we began to check up his statements. As the expression goes, "He's got the goods." If you do not think so just check up on a few jobs. You will be floored when you realize how much hand labor is still used. The machine production methods adopted in all other lines of manufacturing are notable by their absence. And, yet, the making of buildings is one of the greatest constructive industries. What is more—building trades labor is among the highest paid in all lines.

Here is a chance for inventive genius to reap a vast reward.

Buying Ahead

ONE of the outstanding developments of the winter has been the amount of forward buying of construction equipment. During the last several years the policy of insuring spring deliveries has been adopted by a rapidly increasing number of users. The number of delayed delivery orders placed this winter has, however, far exceeded any previous record.

Prospects for another big construction year have, of course, been in the minds of many who have protected their deliveries by buying ahead. Much of the forward buying also has been done by those who already have work in hand on which they want to start at the earliest possible moment. But several other more permanent factors have begun to be recognized in the situation.

One of the most important of these is the price policy in regard to delayed delivery orders that is followed by reliable manufacturers. They accept orders in the winter for spring delivery on the basis of a nominal down payment and with the understanding that the price holds in case there is an advance before delivery. The purchaser also is given the benefit of any price drop between the date of the order and the specified delivery date. In other words, the maker takes all the price risk. The buyer risks only whether he can use the machine.

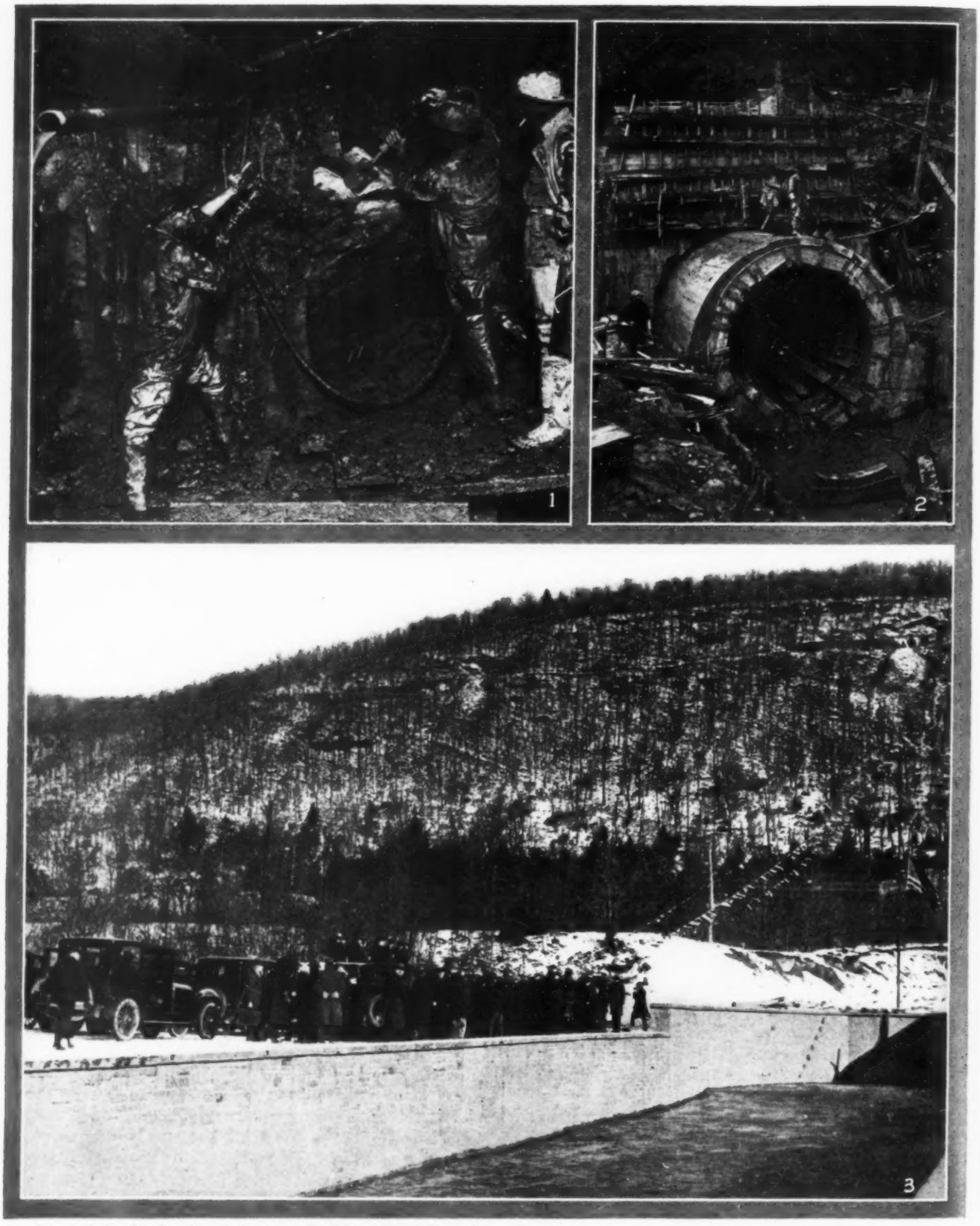
This plan enables the user to avoid any danger of a delay in starting his job. It also permits the manufacturer to adopt a balanced production schedule. Both parties thus gain, which means that there will naturally be more forward buying every winter. All that is needed is for more users to know that they can adopt this policy without risk of loss.

When You Change Your Address

MANY notifications of changes of address are received from readers of SUCCESSFUL METHODS and we are glad to get them because it enables us to keep the mailing list up to date. In some cases, however, those who write in fail to give the old address as well as the new one, which makes it extremely difficult to correct our list. We therefore ask all those who send in changes of address to be good enough to give the old address as well as the new one.

Construction Work

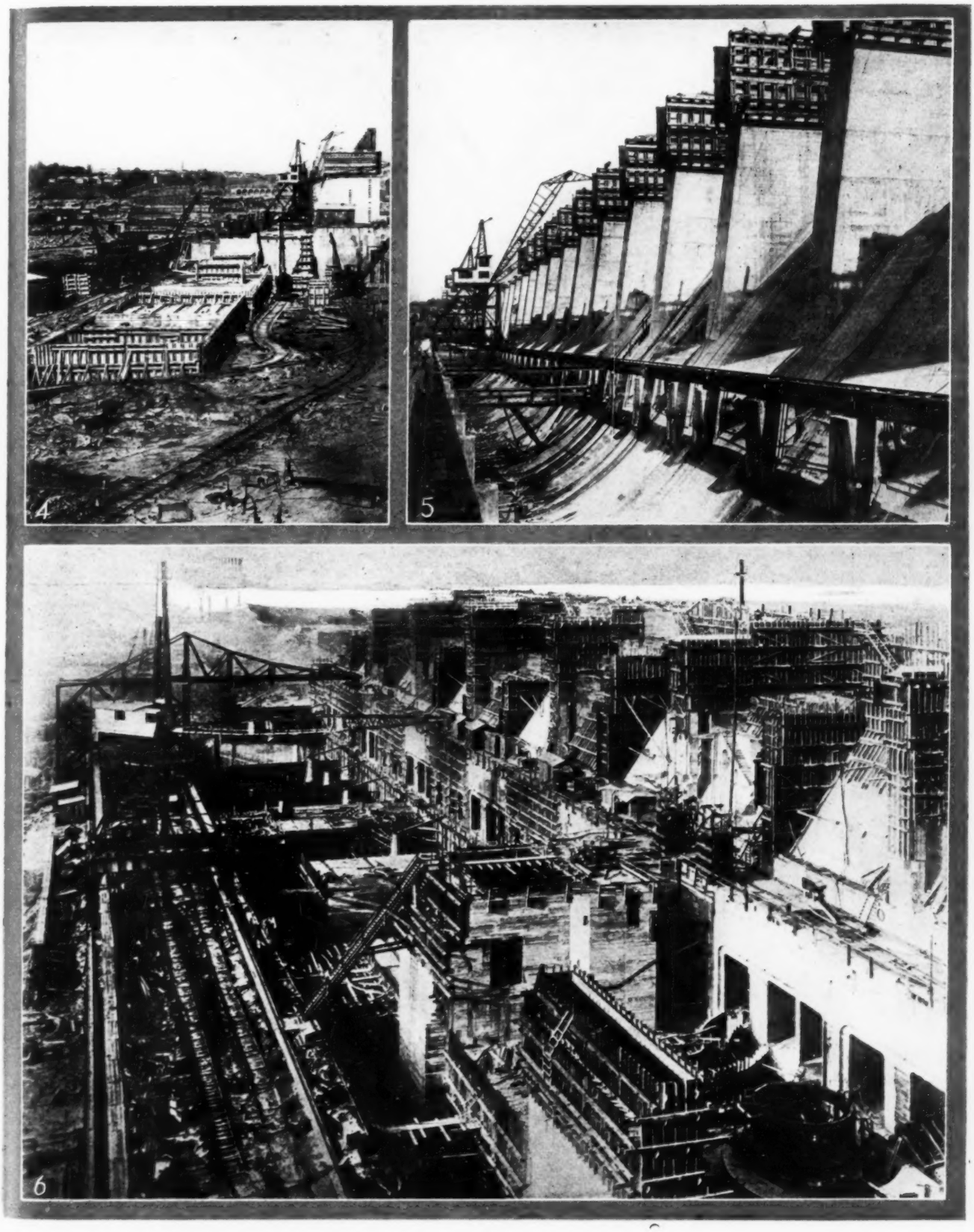
Shandaken Tunnel



1—At work in the depths of the tunnel with pneumatic tools. © *Keystone.*
2—The outlet works of contract 200 on the Allaben Division. This photograph was taken some time ago during the progress of the work. © *Keystone.*
3—The mouth of the long tunnel decked with flags on the day of the official opening, February 9, 1924. The officials of the New York Board of Water Supply, the engineers in charge and the contractors all braved the wintry cold to watch the first water come through. © *International.*

On a Grand Scale

Muscle Shoals



4—One of the big cofferdams under construction. © *P & A Photos.*
5—A view along the face of the gigantic dam. © *P & A Photos.*
6—A general view of the Wilson Dam showing the magnificent scale on which the Muscle Shoals development has been planned. It would be hard to find another construction picture taken in this country in the last year or two showing so much work under way. © *International.*

LONDON'S RUBBER ROADS

Improved Type of Pavement Used Around Cenotaph to Unknown Soldier

FOR several years experiments have been carried on in London with rubber surface pavements, and thus far they seem to show that such a pavement is practical.

Back in 1920 a section of road was laid in Borough High Street, on which the rubber cap was vulcanized on an expanded metal plate. In the three years that have passed since this pavement was put down, only a few of the blocks have come loose. This type of pavement had one drawback, however. The caps had to be laid in wet concrete and the road closed to traffic until the concrete had properly set. In order to obviate this difficulty, two improved types of blocks were devised. The first was a vulcanized rubber cap fastened to a concrete block, the under portion of the cap being molded so as to grip the concrete base. The measurements of this block were 9 by 3 by 3 in.

BUILDING RUBBER ROAD IN BOROUGH HIGH STREET

The second type consisted of an all-rubber block measuring 8 by 4 by 3 in. The upper portion to the extent of half an inch consists of rubber of the quality and resilience used previously, and the remainder is composed of a hard rubber of a lower grade, the two grades of rubber being vulcanized together to form a homogeneous block.

This all-rubber block seemed to work so well that it was decided to pave the carriage way around the cenotaph to the Unknown Soldier in Whitehall with rubber blocks. It was thought that this type of pavement would be peculiarly appropriate for this purpose, as it would deaden the noise of traffic while passing the cenotaph.

Two of the pavements at Euston Station in London also have been paved with rubber. The traffic on these two platforms is heavier than at any other

LAYING NEW BLOCKS IN BOROUGH HIGH STREET

point in the station, and it is estimated that at least 2000 barrow loads of passenger luggage, parcel post, mails, etc., pass over the rubber pavement each day. Nevertheless, there is no sign of wear thus far. Those in charge of the installation of this rubber pavement in London feel sure that it is a success.

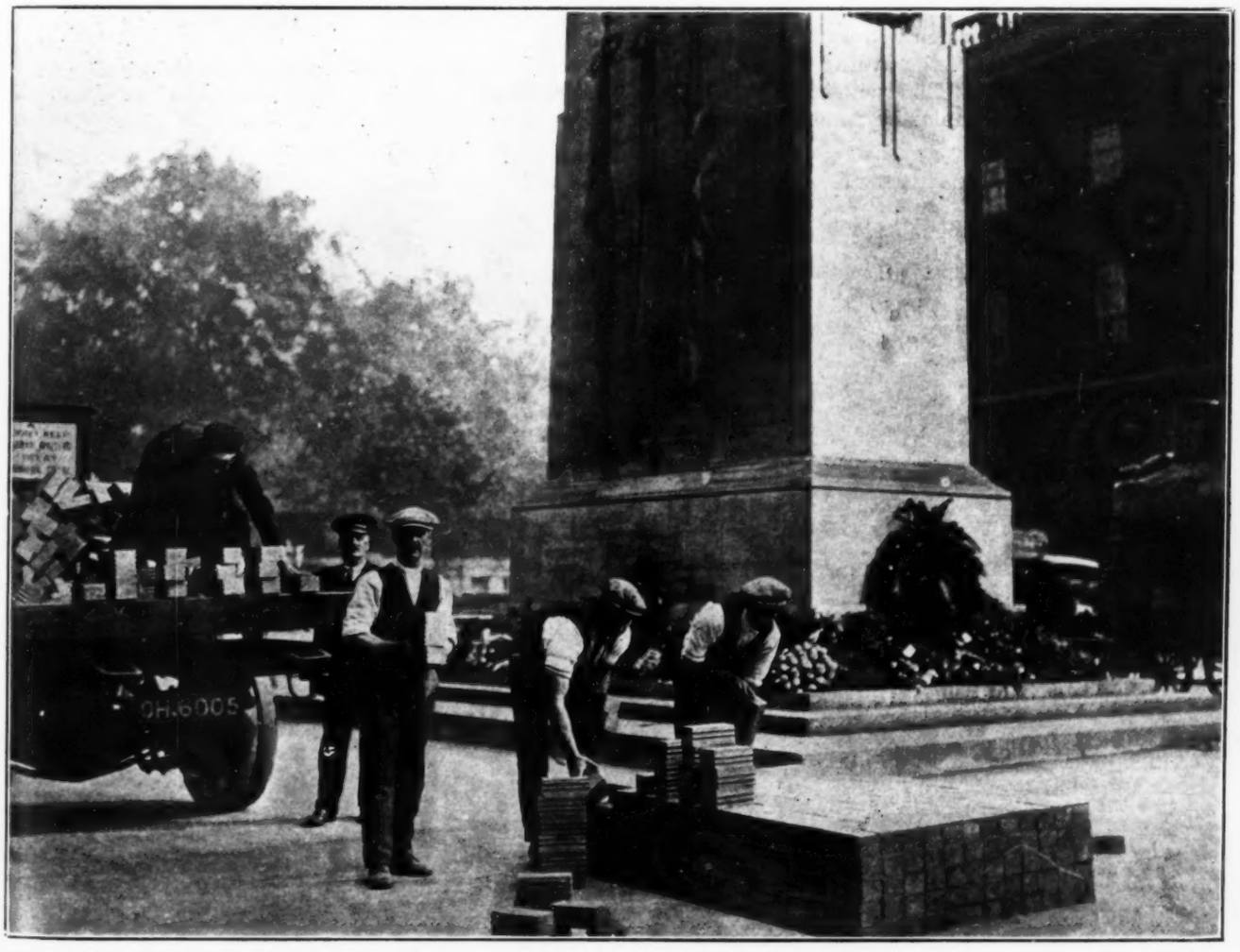
RUBBER ROADWAY OPEN FOR TRAFFIC

The fact that the rubber pavement on Borough High Street has now been down for more than 3 years is regarded as good evidence that so far as London is concerned, at least, the rubber pavement has come to stay. Just how soon the other countries will try out rubber pavements is still problematical, but undoubtedly they will be seen before long in other places than London.

The paving of the streets surrounding the monument to the Unknown Soldier is sure to attract favorable attention to the rubber road if the new pavement holds out as well as that on Borough High Street, and there is no reason to suppose that it will not.

These rubber pavements in London are being watched with great interest by the representatives of other countries and have been made the subject of a report written by Alfred Nutting of the American Consulate-General in London.

So far as is known rubber pavements have not been laid in the United States thus far.



GETTING READY TO LAY THE RUBBER PAVEMENT AROUND THE UNKNOWN SOLDIER'S MONUMENT. © *Keystone.*

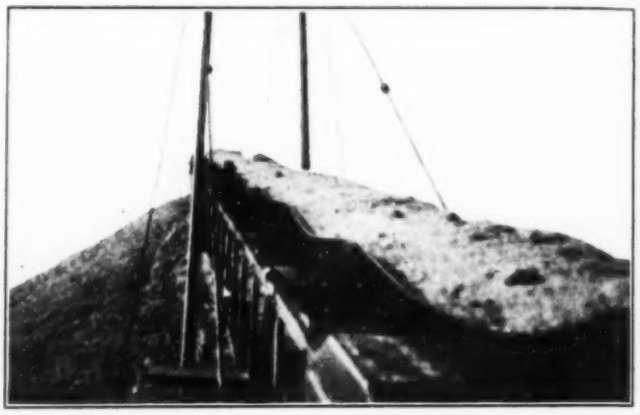
CONVEYORS EXTEND RAILWAY FILL

Battery of Five Unloads Average of 100 Carloads Per Day—Conical Piles of Slag Spread by Hydraulic Method

AN unusual method of making a fill is being used by the John J. Hart Construction Company, which has a contract for construction work in connection with the Lake Erie & Eastern Railroad's switch yard at Youngstown, Ohio. The construction of this fill is an immense job, which will require about a year and a half to complete if the average of 100 carloads a day is maintained. This will mean that about 32,000 carloads will be unloaded in about 500 working days.

BEGINNING A NEW PILE OF SLAG SHOWING TRACK HOPPER UNDER CAR

Five 60-ft. conveyors are being used in extending this fill, and their use enables the construction company to bring granulated slag to the job in dump bottom cars which dump material into track hoppers. These conveyors are first set at an angle of about 20 deg. and dump the material 55 ft. to the bottom of the fill. As the conical piles increase in height, the outer ends of the conveyors are raised until the top of the pile is considerably higher than that portion of the fill which has been completed.



LOOKING ALONG ONE OF THE CONVEYORS SHOWING HEAVILY LADEN BELT

THE FIVE 60-FT. CONVEYORS LINED UP FOR ACTION

ALMOST THROUGH PILING UP THE SLAG

In order to flatten out the conical piles a hydraulic system is used. An 8-in. line under 80-lb. pressure with a 3-in. discharge spreads the slag and makes it possible to unload about 200 cars from every set-up of the conveyors. Dikes 10 ft. high, built around the fill, confine the water when the hydraulic system is in operation. This plan is proving successful.

As soon as a section of the fill has been completed by this method, the conveyors are moved by a locomotive crane to a new position, and the same operation is repeated. The photographs which accompany this article show several phases of the work.

OUR SMOKY COVER

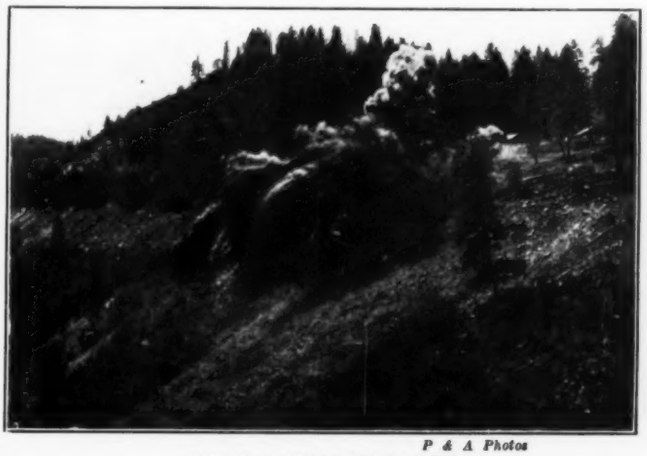
THE rather remarkable photograph which appears on the cover of this issue of SUCCESSFUL METHODS shows the downhill sweep of the smoke from a blast.

P & A Photos

THE FIRST PUFF OF SMOKE

This blast was made recently in the neighborhood of Mount Shasta, California, where the Pacific Gas & Electric Company was preparing to build a dam across the stream shown in the photograph.

More than 200 holes, ranging in depth from 16 to 30 ft., were drilled in the hillside. The cover photograph was snapped just two seconds after the blast and by that time the immense wave of smoke had made its way down the hillside and was seemingly trying to lose itself in the stream. The cover photograph is copyrighted by the Pacific & Atlantic Photos.



P & A Photos

HALF A SECOND LATER

BREAKING WINTER'S GRIP

By V. H. Van Diver

CONSIDERABLE trouble is experienced in many cities because of ice forming in the gutters and later causing flooded streets. Years ago, perhaps, when general contracting stood still during the winter months and labor, as a result, was cheap and plentiful, it may have been possible to put enough men to work to keep the ice broken up. But today, when labor is just as scarce during the winter months as it is in the summer, and just as dear, it is only with the aid of modern labor-aiding devices that any city can attempt to break up great quantities of ice along its streets, or to solve economically other winter problems, such as breaking frozen ground and testing for gas leaks.

CUTTING THROUGH FROZEN GROUND IN DETROIT

Portable air compressors which operate paving breakers, clay diggers and various other pneumatic tools, are fast becoming necessities to the progressive

CUTTING ICE WITH PAVING BREAKERS IN BUFFALO

city. This equipment, with its remarkably small complement of men, is used to carry out street, water or gas mains, sewer improvements, repairs, extension, and, in fact, any number of jobs that confront the vitally important departments of the present day municipalities. With their aid a crew of men can do from five to twenty times as much work as it would be possible for the same crew to do by the best methods prevalent a few short years ago.

TESTING FOR GAS LEAKS IN SCRANTON

During the winter months this equipment does not lie idle in storage. The accompanying photographs illustrate some of the ways in which it may be kept at work in cold weather.

The city of Buffalo, by adapting special bits to paving breakers and clay diggers, found the solution to the problem of freeing their streets of ice. The two large photographs show how the work was done.

The Public Lighting Commission of the city of Detroit used a portable compressor to operate paving breakers for breaking frozen ground, soft loam, after which a trenching machine was used. This made it possible to carry on some necessary extensions without interruption because of the cold weather.

Employees of the Scranton Gas & Water Company,

THE COMPRESSOR THAT SUPPLIED THE JUICE ON THE BUFFALO JOB

in testing for gas leaks through pavement and frozen ground, used a pneumatic drill of ordinary ⅞-in. hollow hexagon steel with a large four-point bit. Testing for gas leaks had always been a tedious task when it was necessary to rely on a jumper steel and sledges. Oftentimes—even where the leaks were costly—it had taken several hours at least to put down a single test hole by the hand method. But, with the air-operated drill, run by one man, this time was cut to ten minutes.

LATIN-AMERICAN COUNTRIES SEND DELEGATES TO VIEW OUR HIGHWAYS

A GROUP of engineers and others identified with highway development in South and Central America will visit this country in June of this year. It is expected that the party of distinguished visitors will number about forty, and they will spend about three weeks here. Their itinerary has not yet been decided upon definitely, but as their time is limited they will be unable to visit the States in the far West.

They will, however, visit several States in which the natural conditions resemble those in their home countries. North Carolina will be the first stop in the highway pilgrimage, and from there the members of the party probably will proceed to the Middle West.

Every effort will be made to show them the various approved types of road construction in this country.

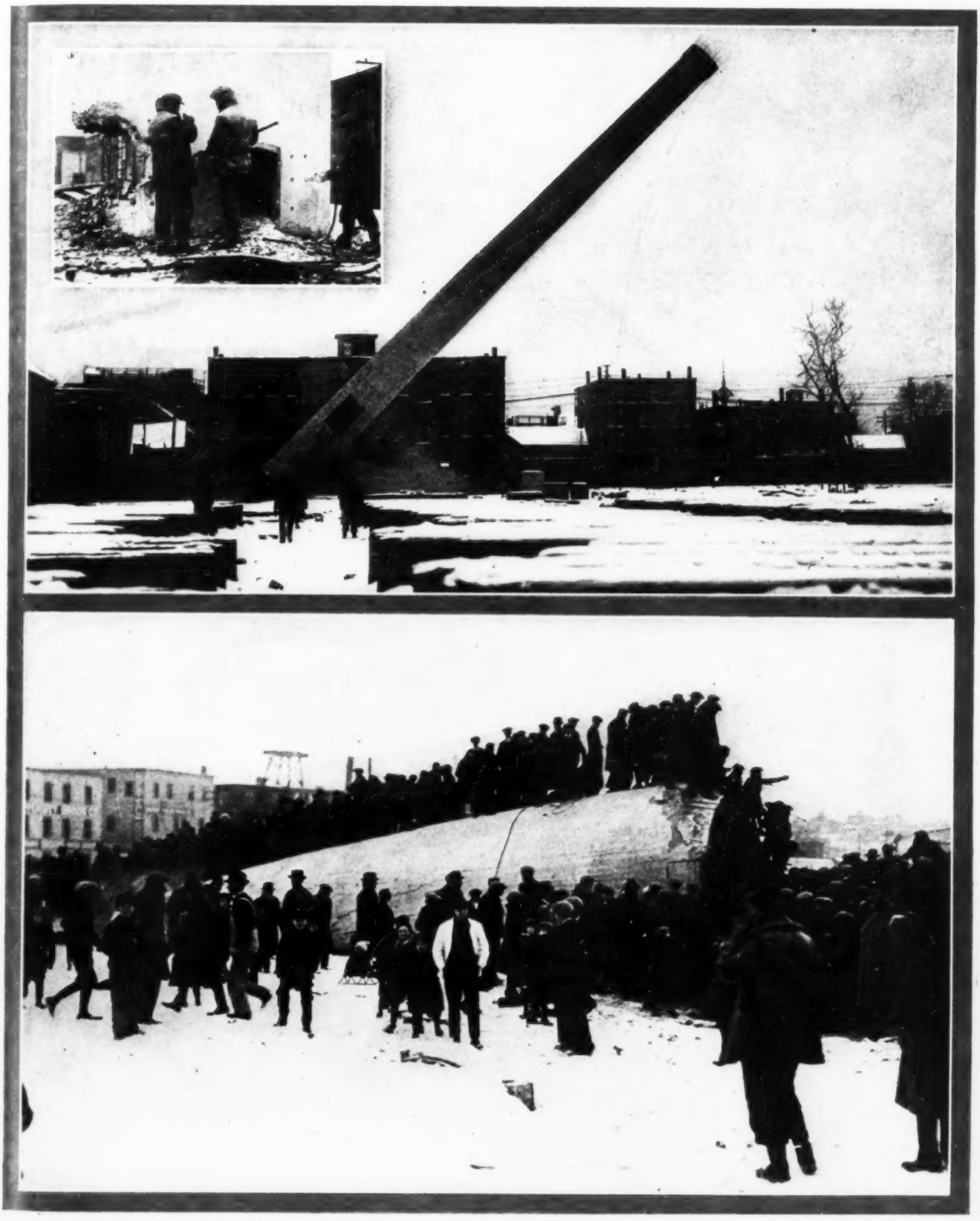
IMPROVING CHICAGO'S FRONT YARD

ONE of the big jobs that is going on in the Middle West at the present time is the improvement of its property along the Chicago Lake front by the Illinois Central Railroad. This project, which will require several years to complete, includes the construction of a new station, the electrification of the tracks and the relocation of other tracks in order to fit in with the Chicago Plan for the beautification of the city.

The accompanying photograph shows one phase of this big job. The States Contracting Company, A. E. Dennis, President, is moving the tracks in order to permit the improvement of the Lake front for park purposes. The photograph shows a steam shovel loading dump cars of 30 cu. yd. capacity, which are being used to move the excavated material. Two 10-car trains are used and the work is proceeding in two 10-hr. shifts. The maximum for one day thus far is 4500 yd. in 20 hr., using a single shovel with a 1¾-yd. bucket. The material is sand or sandy loam.

R. N. Samson is the day superintendent, and O. M. Clark has charge of the work at night. All of this work, of course, has to be done without interfering with the continuous stream of traffic which passes over the Illinois Central tracks. And there are few busier railroads in the United States.

Dropping a Big Fellow



The three stages of the downfall of a reinforced concrete stack, 150 ft. in height, in Cambridge, Mass., are shown on this page. In the small photograph at the top the men are shown cutting away the base of the stack with pneumatic tools. The photograph immediately below shows the stack half way down, and the bottom picture gives a good view of the crowd that witnessed the giant's fall and then swarmed all over the prostrate remains. © *Keystone.*

FOUNDATION PROBLEMS IN WASHINGTON

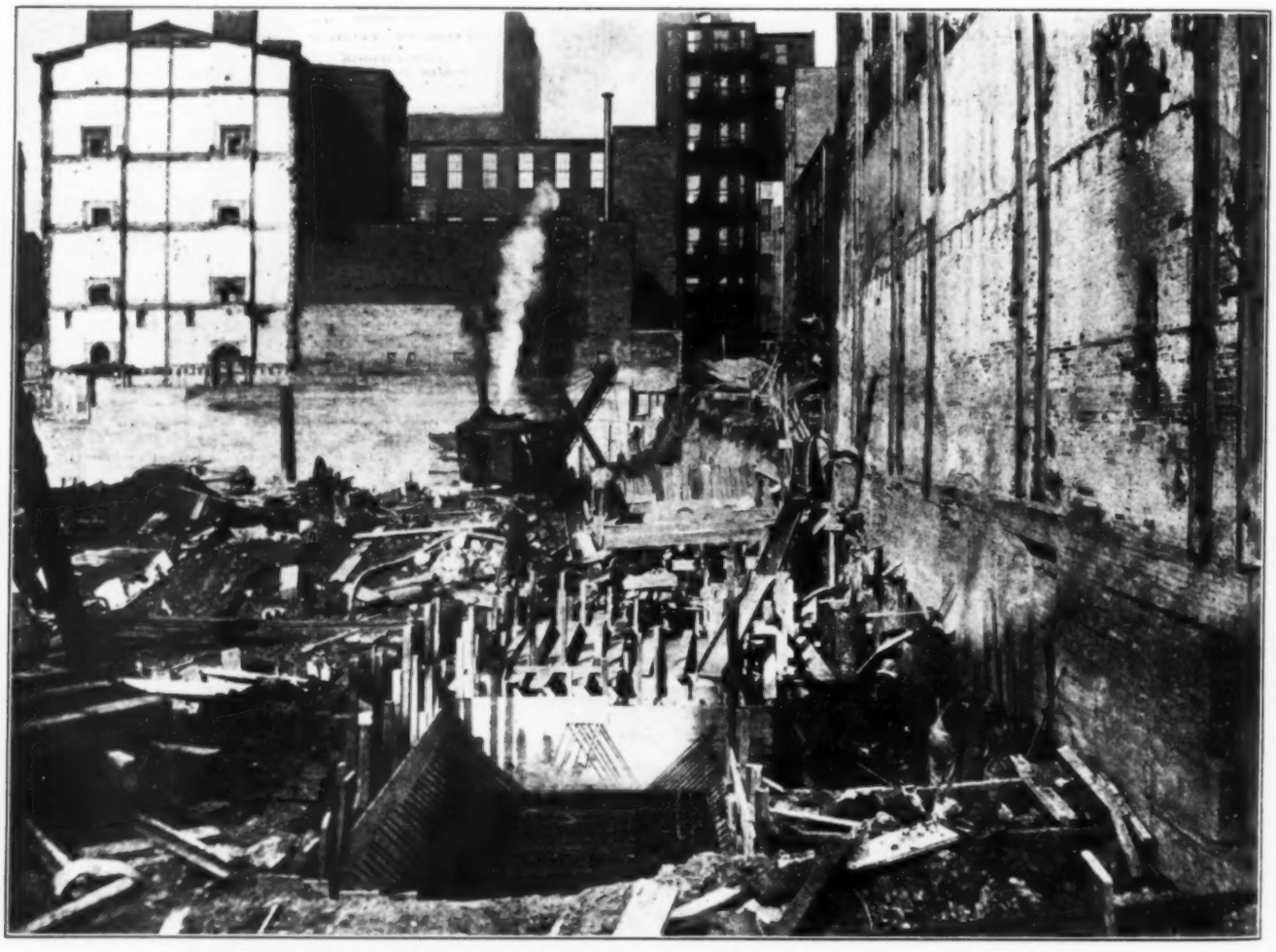
Builders of New Theater in National Capital Conquer Difficulties Caused by Soft Ground

IN the building of the Cosmopolitan Theater and office building at Washington, D. C., a number of construction problems are being encountered by the contractors, the Longacre Engineering & Construction Company of New York City. The foundations have been finished and it is expected that the building will be completed next fall.

The new building is 153 ft. 5 in. in length and 100 ft. in width, and will contain a theater and office building consisting of six floors above the theater. This combination of theater and office building will make it necessary to support the upper floors on trusses which span the roof of the auditorium. This necessitates the elimination of all interior footings except the small piers which support the basement floor.

The ground on which the new structure is being built is very soft, and this fact made considerable underpinning and work of similar character necessary in order to safeguard the surrounding buildings. Piles were used throughout to support the foundations and were driven 40 ft. before hardpan was reached.

In addition, a peculiar and difficult problem was presented by the fact that one of the walls of one of the buildings which were torn down was left standing, as it was desired to utilize it in the construction of the theater building. This loose wall was of the same height as the adjoining building, and it was decided to anchor it before any of the pile driving was begun, as it was feared that the vibration of the pile drivers might bring down the wall. The method adopted to anchor this wall was to drill holes through the wall and on through the adjoining building. Rods were then run through the building, through both walls and through timbers spaced every 20 ft. These timbers may be seen at the right of the photograph at the bottom of this page and in the small photograph on page 14 they may be seen very clearly in the background.



PUTTING IN THE CONCRETE FOUNDATION, SHOWING CHARACTER OF REINFORCING

Another phase of the preliminary work which had to be done was the underpinning of the foundations of the adjoining houses. The house with the white wall at the left of the large photographs on this page and the next had to be underpinned because of the fact that it supported the house beyond it. These two properties had a party wall and it was necessary to construct a cantilever foundation in the cellar of the first house instead of using spread footings. Five of these cantilever footings or tie beams were constructed, which in turn were connected to one reinforced concrete girder. This foundation is now complete and before long the building shown in the photograph will come down.

UNDERPINNING ADJOINING WALL

The large photograph on the bottom of this page shows the mixing and chuting plant which built most of the foundations. This was placed in the center of the lot and a runway was built from the sidewalk. The aggregates were brought down this runway in wheelbarrows and dumped into the mixer, which was placed immediately at the base of the tower. With this arrangement it was possible to pour all of the concrete for the foundations from one setup, as the chute was long enough to reach all parts of the lot.

THE MIXING PLANT ON THE JOB IN THE CENTER OF THE LOT

As stated before, the fact that the theater occupied the main floor made it impossible to use columns in the center of the building, so the foundations have been made unusually heavy and strong. The photograph at the bottom of page 12 shows the character of the reinforcing used. It consists of ¾-in round and 1-in. square bars, placed close together. This particular section of foundation shown in the photograph was poured from a mixer on the street level and not from the regular central mixing plant, which was not in place at the time.

THE WALL IN THE BACKGROUND SUPPORTED BY TIMBERS HELD IN PLACE BY RODS RUN THROUGH NEXT BUILDING

The building when completed, as shown in the small photograph at the beginning of this article, will cost $2,000,000. It is to be built of architectural terra cotta with hollow metal sash and plate glass windows. The floor construction of the office building and the orchestra are to be of terra cotta tile with concrete joints. It is planned to use the roof of the building for an open-air moving picture show during the summer months.

Work on the theater is progressing so far as possible throughout the winter and every effort is being made to finish the job in time to get the fall patronage. When the building is completed it will be a notable addition to the Capital's theaters.

HOIST AND DERRICK STAND THE GAFF

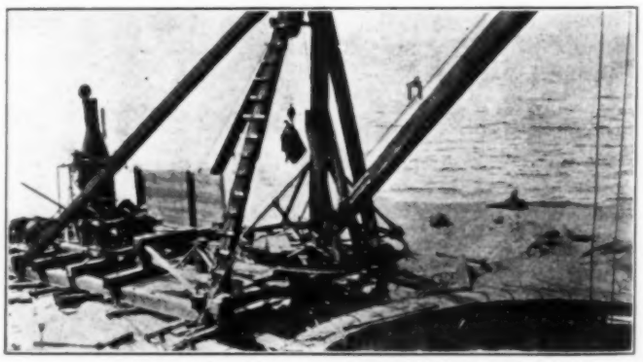
Work on Lake Michigan Beach Is Complicated by Drifting Sand

THE value to the contractor of a well constructed machine is illustrated by the experience of Robert Love & Son, who are building some wells for the city of Muskegon, Mich. These wells are being built on the beach of Lake Michigan and there could hardly be a worse place for the use of a machine with exposed working parts, as it is impossible to keep the sand from being blown into the bearings or other places where it is likely to cause trouble.

HOIST AND DERRICK AT WORK AMONG THE SHIFTING SANDS

The machines shown in the accompanying photographs consist of a steam hoist and a portable A frame derrick. The hoist and derrick have been on the job continuously for nine months, have been moved from one well to another as the work progresses, and thus far have not been taken down for repairs. This performance is vouched for by Roy R. Love of Robert Love & Son.

This kind of service from any machine makes money for the contractor using it. Not only the actual cost of repairs, but, more important than that, the time lost while the repairs are being made, eat into the contractor's profits, and when he gets a machine that will stand the gaff day in and day out, one great cause of his worry is eliminated.



A CLOSE-UP OF THE MACHINE WITH THE RUN OF ONE OF THE WELLS AT THE LEFT

DITCHER DIGS BOTH TRENCH AND BELL HOLES

Reduces Hand Labor to Minimum on Public Service Work in Central Illinois

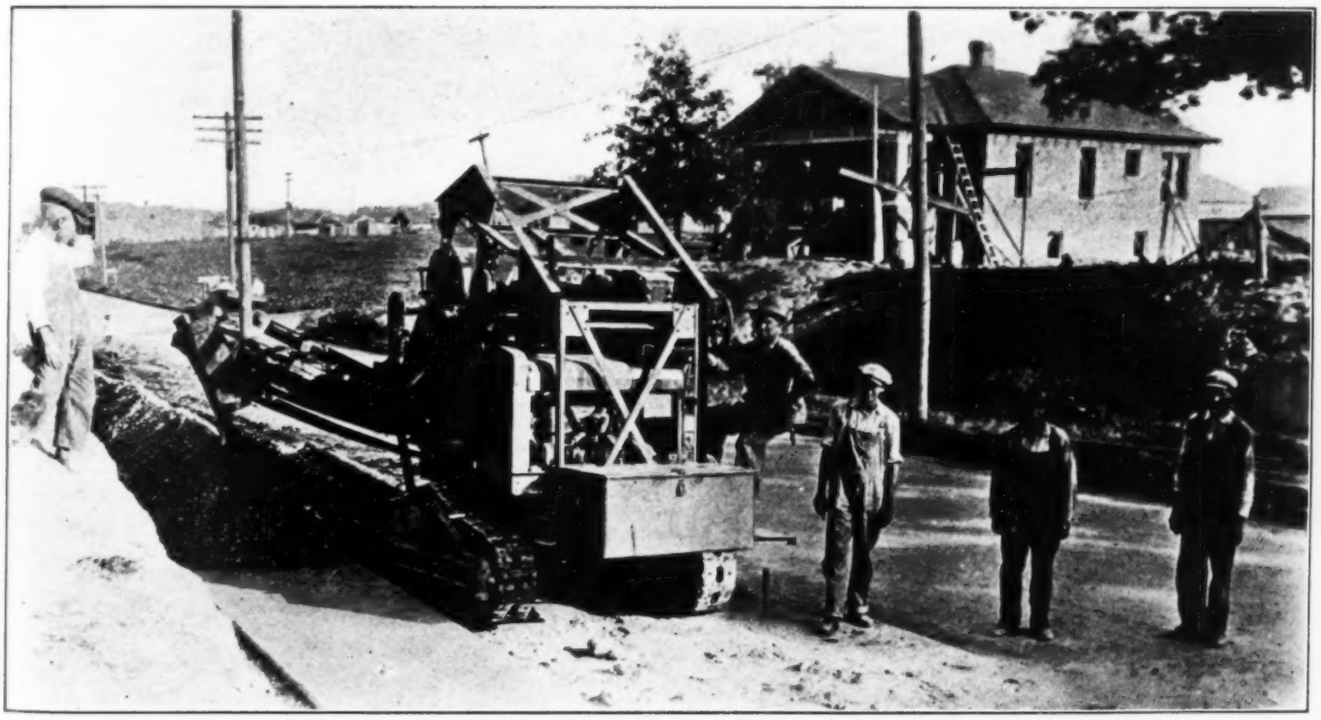
A DITCHING machine is being used by the Central Illinois Public Service Company not only for trench digging, but for the digging of the bell holes necessary at stated intervals. The two photographs on this page show this ditcher in action at Benton, Ill.

The trench shown in the photographs was for 4-in. and 6-in. water mains and was only 3 ft. 6 in. in depth. As the ditcher was capable of digging to a depth of 5 ft. whenever the bell hole points (marked in advance by stakes) were reached, the machine was adjusted to cut to the 5-ft. depth for a distance of 2½ ft. and was then brought back to grade. In this way hand labor was eliminated, both in the digging of the ditch and of the bell holes.

The trench dug at Benton was 24,000 ft. in length, and after this job was finished the machine was shipped to Lawrenceville, Ill., where it dug 3500 ft. of similar ditch.

The ditching machine also is equipped with a mechanical sprocket which enables it to slip an overload and then return to its original position. If the overload is still present, the sprocket is released again, and this action is continued indefinitely until the operator decides that the stone or other obstruction cannot be dislodged by the machine.

J. D. Roberts, chief engineer of the Central Illinois Public Service Company at Springfield, had general charge of this work.



DITCHER AT WORK ON TRENCH SHOWING DISCHARGE OF MATERIAL AT SIDE. STAKE MARKING BELL HOLE JUST AHEAD OF MACHINE

BUILDING THE ST. PAUL UNION STATION

Construction Work Spread Out Over a Period of Nine Years—Foley Brothers on Job Now

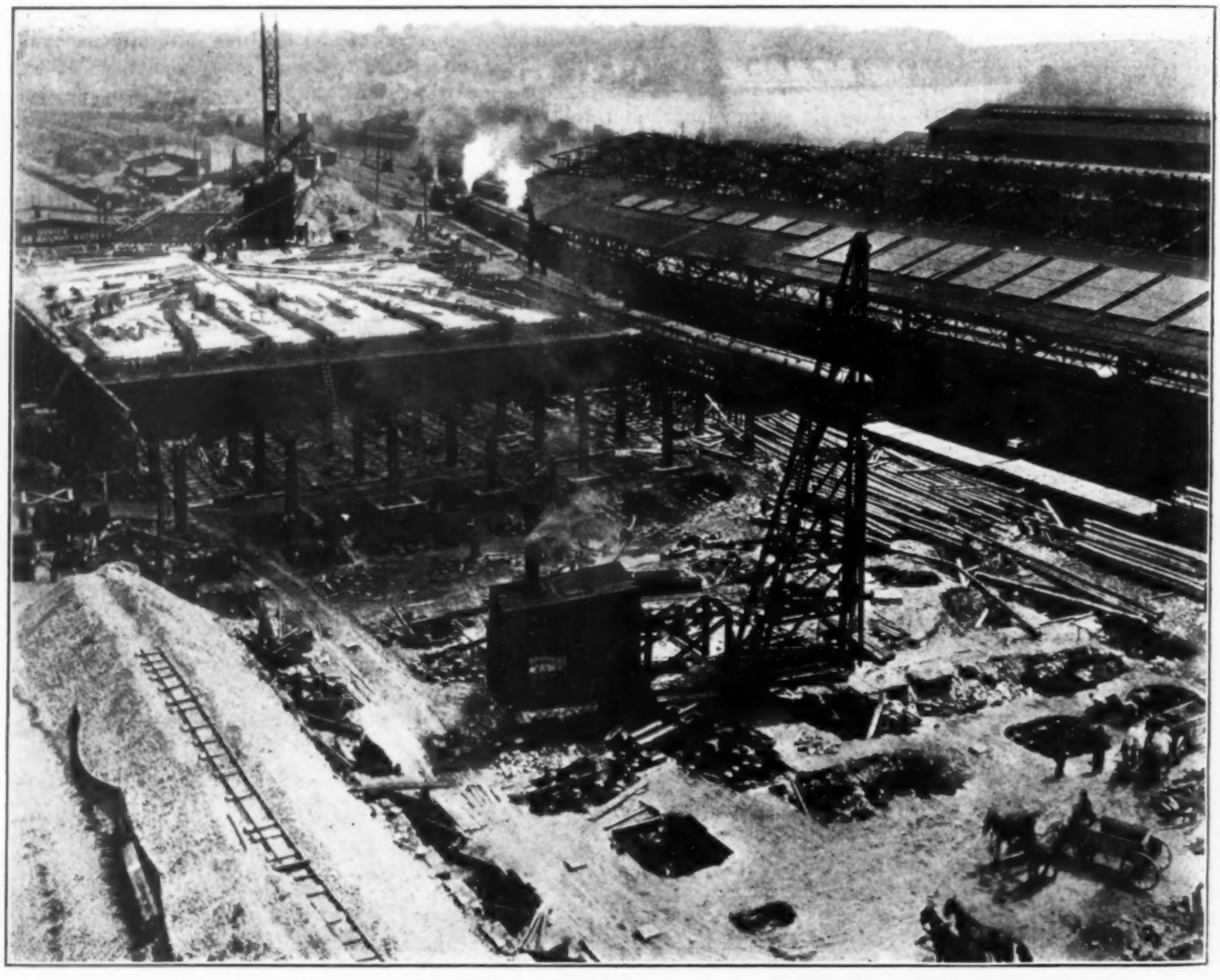
A CONSTRUCTION job planned to extend over a period of nine years is in progress at St. Paul, Minn. The great Union Station in that city was begun in the spring of 1917 and the work was spread out over six periods. The first two periods contemplated the building of the main lobby and part of the arrival concourse. They were begun in 1917 and completed in November, 1921.

The third period, which includes the construction of the main track structure and the remainder of the concourse, is now nearly finished. The remaining three periods will be finished within the next two years. The contractors for the construction of the main station building were Morris, Shepherd & Dougherty and the George J. Grant Construction Company of St. Paul, but the general contract for the work on periods 3, 4, 5 and 6 was let in March, 1923, to Foley Brothers, Inc., of St. Paul. The work has been carried on under the direct supervision of D. A. Daly, chief engineer for Foley Brothers, and of J. R. Holmes, assistant superintendent.

Although there was an unavoidable delay of nearly two months in getting started, Foley Brothers have kept the job moving continuously since that time by the use of three shifts of men and the employment of labor-saving equipment wherever possible.

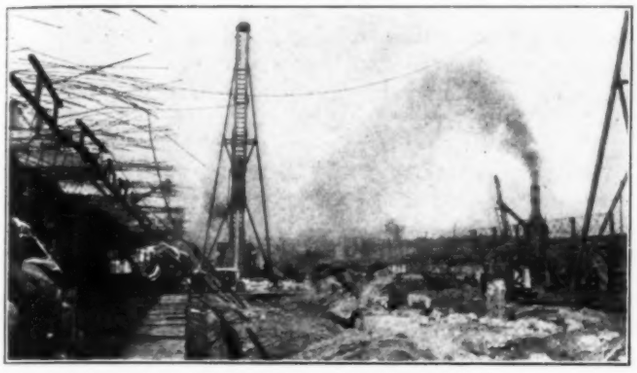
The establishment of the 24-hr. working day by the use of three shifts made it possible to employ the two night shifts in clearing the ground, setting the forms and placing the reinforcing steel. The day shift could then devote its attention to pouring the concrete. Working in this way, it proved possible to place an average of 22 tons of steel in 8 hr. and pour 500 cu. yd. of concrete a day. A force of about 300 to 350 men was employed.

Traffic congestion made the work extremely difficult. The station stands between the city's busiest wholesale district and the Mississippi River, and the



THE UNION STATION JOB IN ITS EARLY STAGES SHOWING THE MAIN BUILDING UNDER CONSTRUCTION

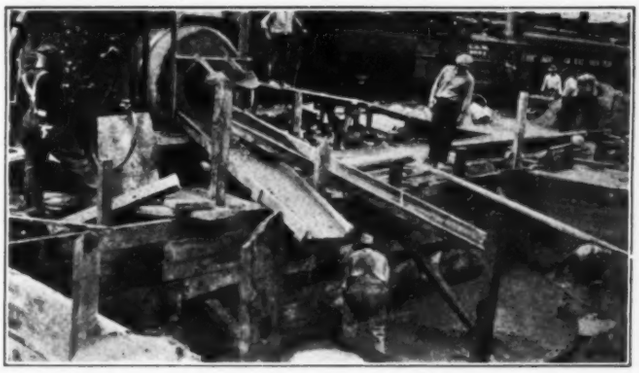
construction work had to be carried on without interruption of traffic either on the streets or on the railroad. There was little space available, except that which was to be covered by new construction, and thus the contractor had cramped quarters for storage



GETTING READY FOR PIER FOOTINGS BY BLASTING. PILE DRIVER IN BACKGROUND

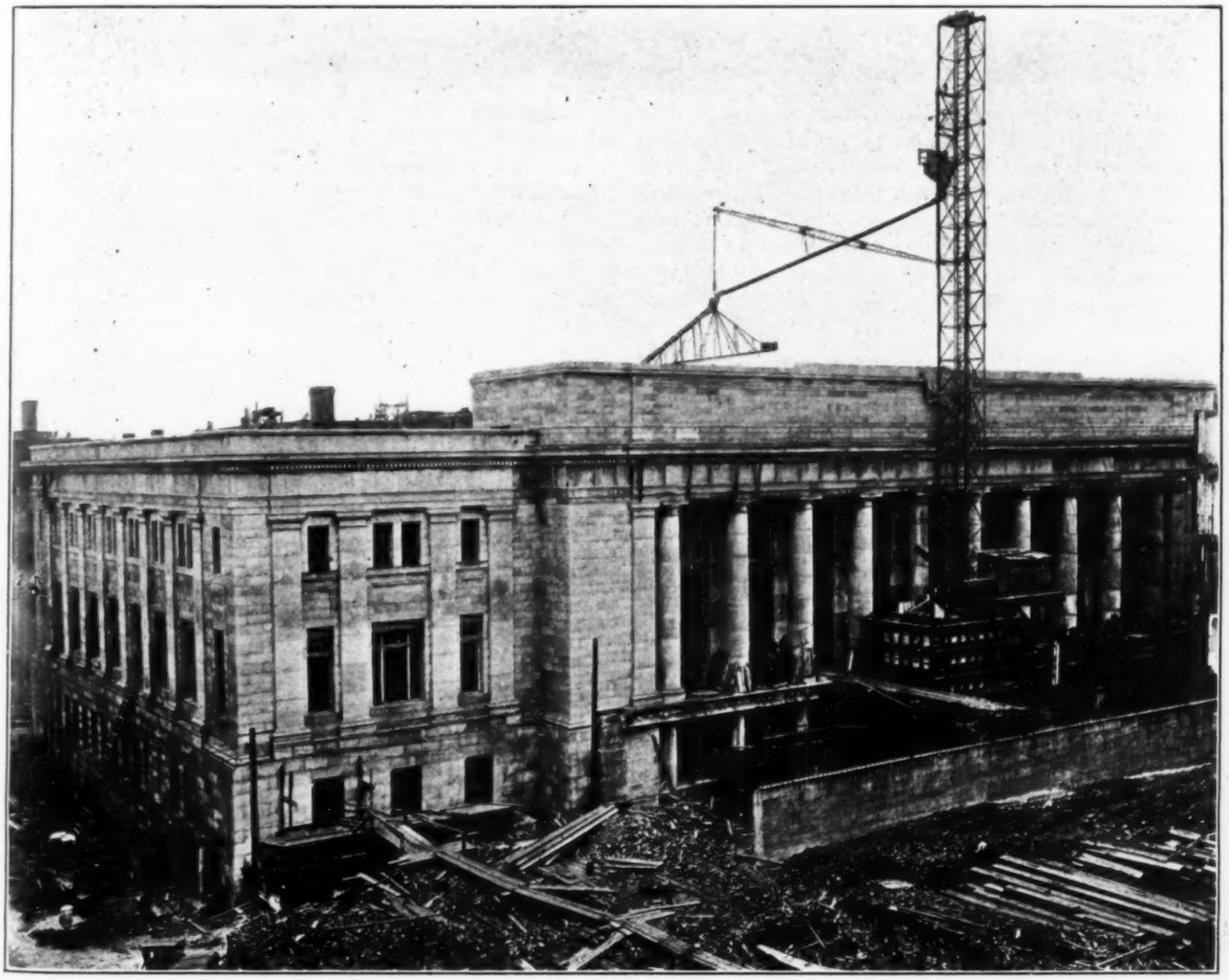
purposes. The cement and aggregate for 25,000 cu. yd. of concrete had to be handled on a piece of ground about 250 ft. by 80 ft.

Only rapid handling of the aggregates saved the



PORTABLE MIXER USED FOR POURING FOOTINGS WHICH COULD NOT BE REACHED FROM MAIN PLANT

situation. The sand and gravel were hauled in on freight cars and unloaded to stock piles with a locomotive crane. A horizontal conveyor then carried them to a vertical conveyor, which in turn deposited them in measuring bins built above the mixer. The cement was added to the sand and gravel when they reached the batch hoppers. The concrete was then hoisted to the top of a 160-ft. tower and carried from there through a 200-ft. chute to one of the two hop-



THE MAIN BUILDING ALMOST COMPLETED SHOWING CHUTING TOWER

pers. The first of these hoppers supplied cars, hauled on narrow-gage track, which took the concrete to various points of the job, from where it was hauled in concrete buggies to the footings on which it was used. The second hopper was built high enough to load motor trucks equipped with 1-yd. hopper bodies, which took the concrete across the floor to the far edge, where the new slab was being poured. The retaining wall footings at the extreme outer edge of the work, which were too far away from the main mixing plant, were poured with a ¾-yd. portable mixer.

This description of the concrete work shows the methods by which Foley Brothers are handling this big job under difficult conditions. The rest of their work, such as clearing the site, removing the old train shed, footings, etc., also was handled with the maximum of machinery and the minimum of labor. The photographs show various phases of the work.

AERIAL MOSAICS HELP IN PLANNING CONSTRUCTION WORK

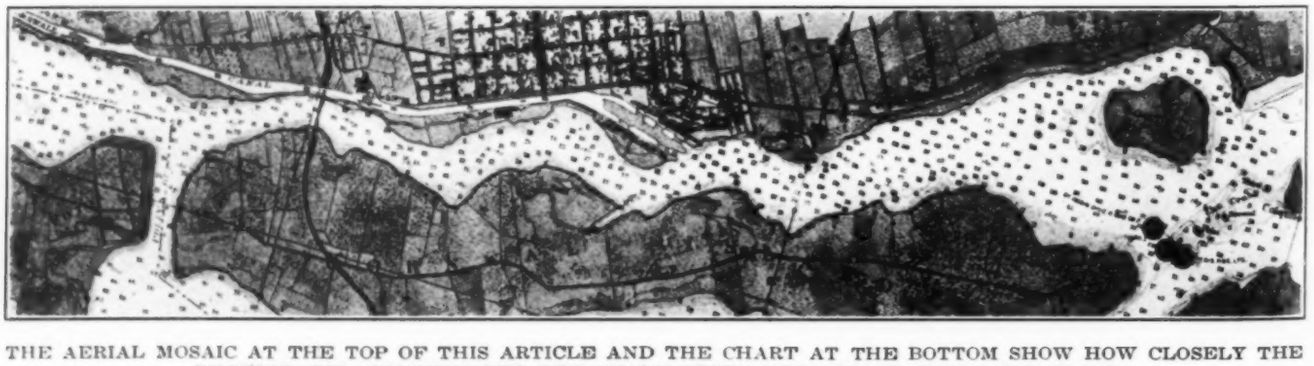
Photographs Taken from Airplanes Are Used in Conjunction with Charts

THE accurate results which may be obtained in the planning of construction work by the use of photographs taken from airplanes is well illustrated by the work which has been done on the St. Lawrence Waterway Project. The Canadian Air Board has prepared for the use of the International Joint Commission a series of aerial mosaics made by Flight Lieutenant H. L. Holland operating from the Ottawa Station.

They were taken while the airplane was flying at an altitude of 9000 ft., and as the conditions were extremely favorable it was not necessary to make rectification in the individual negatives. In mapping large areas from the sky, it is, of course, impossible to match all of the photographs exactly. Various disturbing elements, such as sunlight and shadows and passing vessels, tend to give a finished mosaic a rather patchy appearance. These do not interfere, however, with the actual value of the mosaics, as they may be discounted by the person using them.

The speed with which these mosaics can be made as compared with the laborious work necessary in preparing an ordinary chart, is an important reason for their use. The aerial mosaic shown on this page was made in 2½ hours. The closeness with which it follows the accurately prepared chart of the same section of the St. Lawrence River as shown at the bottom of the page shows that, although not absolutely accurate, such mosaics are accurate enough to be of great use in planning construction work on a large scale.

Both the chart and the mosaic have been reduced to exactly the same scale and cover an area of 10 square miles, showing the St. Lawrence River and the canals in the vicinity of Cornwall, Ontario. A comparison of the two shows the accuracy with which the topographical details are brought out by the aerial photographs and the possibilities of using such photographs in revising maps. The taking of these photographs (140 exposures in all) was accomplished on a single flight.



THE AERIAL MOSAIC AT THE TOP OF THIS ARTICLE AND THE CHART AT THE BOTTOM SHOW HOW CLOSELY THE PHOTOGRAPH APPROXIMATES THE CHART WHEN REDUCED TO THE SAME SCALE

ARC TYPE DAM IN NEW ENGLAND

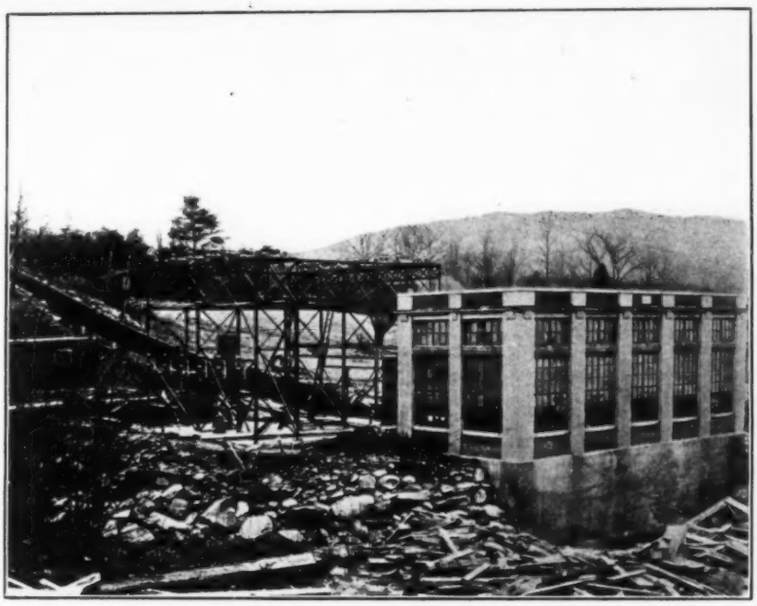
Hydro-Electric Development Brings Western Construction Methods to East

THE DAM IN BACKGROUND AND 4 FT. PENSTOCK OF CALIFORNIA REDWOOD IN FOREGROUND

ACROSS the Minnewawa River in Marlboro, N. H., a reinforced cement dam has just been completed which will supply southern New Hampshire with additional hydro-electric power for eleven towns and villages in that section of the State. The dam is of the arc type, built on an 80-ft. radius, and happens to be the only dam of this kind east of the Mississippi River. The height is 60 ft., the length at the crest 145 ft., the width 10½ ft. at the base and 4½ ft. at the crest.

The natural formation of the valley, across which the dam has been constructed, is of solid ledge, and considerable blasting had to be done during the construction. The storage of water will make the water elevation 276 ft. above the level of the power house, which has two water wheels and two generators that will give an output of 2500 hp. The water supply is fed from a pondage of 1500 acres, and additional water supply can be provided by damming up some of the available ponds in the vicinity of the main dam.

Leading from the dam is a penstock, built of California redwood. The penstock is 5700 ft. in length and is supported on cement cradles. The diameter of the penstock is 4 ft. A spillway is provided at one end of the dam and will take care of the high-water period by preventing water going over the top of the dam. The power lines will connect with the Connecticut Power Co.'s lines and a new transforming station has been erected at Keene, N. H., which will be used in conjunction with this added hydro-electric power made available by this project. The new dam is an excellent example of how the types of construction in use in the West are being brought back East. The use of California redwood for a New England penstock awakens memories of the Forty-Niners who left the East for the Golden West in order to seek their fortunes in undeveloped territory.



POWER HOUSE IN VALLEY 5700 FT. BELOW DAM

PENNSYLVANIA HELPS ITS MOTORISTS

THE Pennsylvania Highway Department has issued a vest pocket booklet entitled "Facts Every Motorist Should Know." Of course, much of the material contained in this booklet, such as license fees, etc., is applicable only to Pennsylvania, but it contains also considerable matter that can be read with profit by motorists in any part of the United States. Pennsylvania's rules of the road are carefully explained and a diagram is used to show the proper procedure when approaching street intersections. This book is being distributed throughout the State by the Highway Department and by so doing Pennsylvania is, as usual, showing its enterprise in matters relating to its highways.

MODERN ROADS IN MEXICO

IN spite of the unsettled conditions in Mexico, many activities are going along much as usual, and the two accompanying photographs show work which is

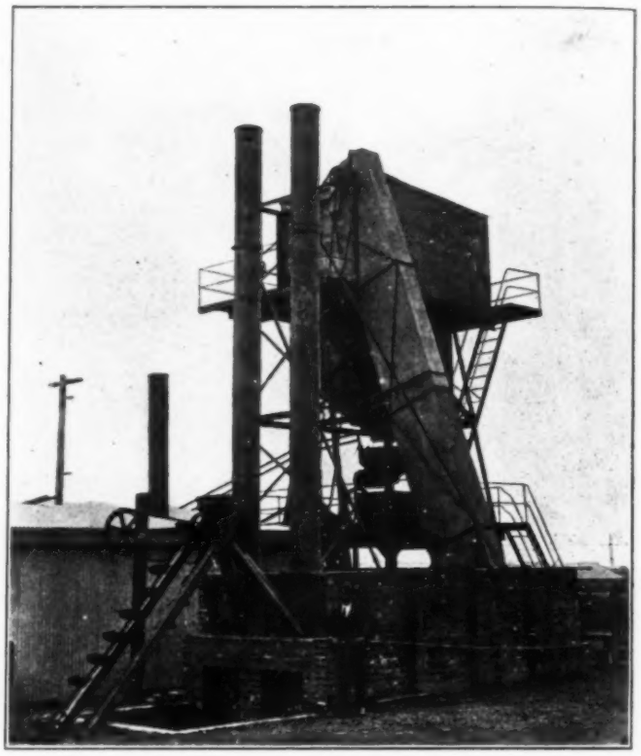
being done on the road from Mexico City to Tlalpan. This road is 20 miles long and 20 ft. in width and is being built of macadam sprayed with petroleum. All of the materials used in constructing the road were transported in motor trucks, and, as may be seen in the photographs, the road was built by modern methods. Much of the machinery used on this job was of American manufacture.

AUSTRALIA CONSTRUCTS UP-TO-DATE HIGHWAYS

AUSTRALIA is now enjoying its first asphalt-concrete road which was built by W. B. Carr, who used equipment manufactured in the United States. The road was built for the Kuring-Gai Council of Gordon, New South Wales, is 6¾ miles in length and is one of the main roads north out of Sydney Harbor. It is known as the Lane Cove Road.

It was built 18 ft. wide with 3-ft. shoulders on each side and consisted of a 3½-in. black base with a 2-in. wearing surface and a flush top coat.

A similar road is now being built for the Melbourne City Council, H. E. Morton, City Engineer, and the accompanying photograph shows the driers, mixing towers, etc., of the plant for the Melbourne job. The man in the foreground is Emmet Brooks Gavin, supervising engineer for W. B. Carr. He is an American and to him fell the job of assembling the equipment in San Francisco, taking it out to Australia with him and setting it up when he arrived.



AN ITALIAN APARTMENT

ANOTHER example of the work being done in foreign countries by readers of SUCCESSFUL METHODS is shown below. This large apartment building was constructed by G. B. Carera in Turin, Italy, where he is engaged in construction work. This building is only one of a number of big buildings which Mr. Carera has built in the last few years.

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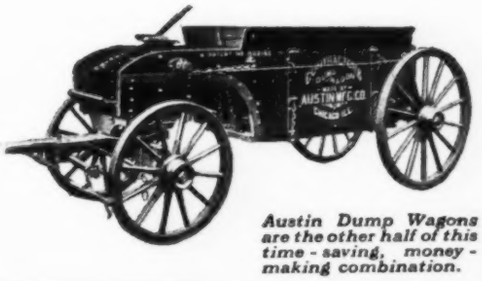

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